

ART. I.—*Some Facts determining the rate of the Upheaval of the South Coast of the Australian Continent.* By LUDWIG BECKER, Esq.

[Read before the Institute, March 24th, 1858.]

IN October, 1855, I had the honor to read before the Philosophical Institute a paper containing some remarks on the changes in Australia, by upheavals. I then called attention to the fact that the land is still gradually rising, and expressed a hope that, with the assistance of tide-gauges, results might be gained, telling us how much the ground has risen in a given time.

Since that paper was read, I directed my attention more closely to this subject, gathering as many observations as possible concerning these upheavals; and the result of these observations made by myself and others, here and elsewhere, I have now the honor to lay before the Philosophical Institute.

The bottom of Hobson's Bay rose, in twelve months, four inches, according to the lines drawn on sheets of paper by the self-registering tide-gauge at Williamstown. These papers were kindly placed before me by Mr. Ellery, the talented superintendent of the Williamstown Observatory. That gentleman also told me, that, five years ago, he noticed many times that the foot of the old Williamstown flag-staff, which was only a little lower than the present one, was washed by high water, while, at present, the whole space surrounding is covered with a green vegetation, and tents and other dwellings are now built on ground which was, a few years back, periodically flooded by the waters of Hobson's Bay. Between the old pier and the lighthouse, as is well known, a foot below the road, the ground consists almost entirely of dead shells, deposited there by the sea. I find embedded between the horizontal layers of these shells the skulls of sheep and bullocks, filled with clayey matter containing dead shells. The spot where these bones are still to be seen is at least four feet above the average level of the Bay. These remnants were not deposited there lately by human hands, but thrown

into the sea when the water, close at hand, offered itself as the nearest place for getting rid of the useless fragments. These observations were made on the west shore of Hobson's Bay, where no deposit of the river Yarra influences the change of the ground. A deposit from that river does influence a similar change, which is more visible on the south-east from the mouth of the river, along Sandridge, St. Kilda, and nearly as far as Brighton. The beach along these places appears even more upheaved; but it is impossible to draw a certain conclusion therefrom because of the interference of the Yarra deposit.

In South Australia, so I learned from Captain Cadell, the railway between the City of Adelaide and the Port of Adelaide rose, in the first year after its construction, nearly four inches.

Flinders, in 1802, found ten fathoms of water on a certain point in Lacepede Bay, where, on a late survey, only seven fathoms of water were found.

The newspapers, a few days ago, brought word that the Government of South Australia have considered it necessary to re-survey the whole sea-coast of that colony, and have started a vessel to commence the work forthwith.

It appears, therefore, that since the expedition of Flinders, the soundings of that navigator are rendered useless by the action of subterranean powers.

All these figures, when reduced to inches and months, show a rise of the land of about four inches per annum. The motion of the earth's crust in the southern part of Australia, so far as yet ascertained, is at present slowly upwards and permanent. Whether sudden rises, during or after an earthquake, have happened, I cannot say at present.

We hear that Melbourne was formerly visited by great floods, but the wharves near Flinders-street, the lowest part of the city, have not, in recent times been inundated by the Yarra, although rain and snow in the mountains have lately sent down great bodies of water. But if the wharves at Melbourne have risen about six feet during the last twenty years, their present freedom from floods is quite natural.

I thought it worth while to draw the attention of the Philosophical Institute to these few facts. If further observations should confirm what I have stated here, useful conclusions might be drawn therefrom, and the practical advantages become evident. I need only point out that care must be taken in forming piers, dams, breakwaters, &c., in Port

Phillip and in similar places along the rising coast; and also in the selection of places for townships, wharves, and docks; and, lastly, that it is important that our own coast be re-surveyed for the sake of the life and goods in ships approaching it.

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ART. II.—*On the Reclamation and Cultivation of Batman's Swamp.* By ALEXANDER KENNEDY SMITH, Esq., C.E., F.R.S.S.A.

[With a Plate.]

[Read before the Institute, May 5th, 1858.]

MR. PRESIDENT AND GENTLEMEN—In preparing this paper upon the reclamation and cultivation of Batman's Swamp, I have endeavoured to make it more a practical digest than a theoretical essay.

Residing upon a portion of the Swamp, and having erected the City Gas Works there, I have had a greater interest in, and a wider field for observation, than those who casually or occasionally visit that locality. The result of these observations is contained in this paper, which I have endeavoured to condense as much as possible, consistent with bringing the evil and its remedy fairly before your notice.

This swamp is situated at the west end of this city, and is bounded by the Murray River and Mount Alexander Railway on the east and north; by the Salt Water River and Footscray on the west; and by the Yarra Yarra on the south. (See Plate.)

All that portion of it that lies north of a line forming the continuation of Victoria-parade, or Victoria-street, running due west to Footscray, has been disposed of by the Government, and the extent of the major and remaining portion, after allowing a margin of three chains in breadth along the Yarra Yarra and the Salt Water River, and also allowing a reserve of 20 acres near the Powder Magazine and Railway Station for docks, is 1030 imperial acres.

The surface of this large plain is lowest in the centre, by an average depth of 10 inches, and has no outlet either to the Yarra Yarra or Salt Water River. This hollow or basin is therefore the receptacle of surface water, and is principally supplied by the Moonee Ponds district.

When a heavy rain falls, this basin is filled, and overflows